

Claims

1                    1. A sulphur-vulcanizable rubber composition comprising at least one diene  
2                    elastomer, a reinforcing filler and a coupling agent providing the link between the reinforcing  
3                    filler and the elastomer, wherein the reinforcing filler comprises a modified carbon black  
4                    characterized by:  
5                    (i)        being coated at least in part with a layer of aluminium oxide and/or  
6                    hydroxide;  
7                    (ii)        having a specific BET surface area of between 30 and 400 m<sup>2</sup>/g;  
8                    (iii)        having an average particle size (by mass),  $d_w$ , of between 20 and 400 nm;  
9                    and  
10                    (iv)        having an ultrasound disagglomeration rate,  $\alpha$ , of greater than  $1 \times 10^{-3} \mu\text{m}^{-1}/\text{s}$ ,  
11                    wherein the disagglomeration rate is measured via an ultrasound disagglomeration at 10%  
12                    power of a 600-watt ultrasonic probe.

1                    2. The composition of Claim 1, wherein the disagglomeration rate  $\alpha$  is greater than  
2                     $1.5 \times 10^{-3} \mu\text{m}^{-1}/\text{s}$ .

1                    3. The composition of Claim 1 or 2, wherein the modified carbon black has an  
2                    amount of surface aluminum greater than 0.25% (% by mass).

1                   4. The composition of Claim 3, wherein the amount of surface aluminium is  
2   between 0.5% and 5%.

1                   5. The composition of Claim 1, wherein the amount of modified carbon black is  
2   more than 50 % by weight of the total reinforcing filler.

1                   6. The composition of Claim 5, wherein the entire reinforcing filler comprises the  
2   modified carbon black.

1                   7. The composition of Claim 1, wherein the reinforcing filler further comprises  
2   silica.

1                   8. The composition of Claim 1, wherein the composition comprises 20 to 300 phr  
2   (parts per one hundred parts by weight of elastomer) reinforcing filler.

1                   9. The composition of Claim 1, wherein the amount of coupling agent is between  $10^{-7}$   
2   et  $10^{-5}$  mole per square meter of reinforcing filler.

1                   10. The composition of Claim 9, wherein the amount of coupling agent is between  
2    $5 \times 10^{-7}$  and  $5 \times 10^{-6}$  moles per square meter of reinforcing filler.

1           11. The composition of Claim 1, wherein the diene elastomer is selected from the  
2 group consisting of polybutadienes, polyisoprenes or natural rubber, butadiene-styrene  
3 copolymers, butadiene-isoprene copolymers, isoprene-styrene copolymers, butadiene-styrene-  
4 isoprene copolymers, and mixtures thereof.

1           12. The composition of Claim 11, wherein the diene elastomer is a butadiene-styrene  
2 copolymer prepared in solution having a styrene content of between 20% and 30% by weight, a  
3 content of vinyl bonds of the butadiene part of between 15% and 65%, a content of trans-1,4  
4 bonds of between 20% and 75% and a glass transition temperature of between -20°C and -55°C.

5           13. The composition of Claim 12, wherein the diene elastomer further comprises a  
6 polybutadiene having more than 90% cis-1,4 bonds.

7           14. A rubber article comprising a composition according to any one of Claims 1 to  
8 13.

1           15. A tire comprising a composition according to any one of Claims 1 to 13.

1           16. A tire tread comprising a composition according to any one of Claims 1 to 13.